USER-CENTRIC SYSTEMS ENGINEERING

Integrating User Experience Design with Traditional Systems Engineering

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“...engineers usually ask the user to predict behavior, which is difficult to do, and so users usually will respond with opinions rather than what’s technically and operationally important”

David Travis
UX Design is the discipline that focuses on enhancing user satisfaction with a product by improving the usability, accessibility, and pleasure provided in the interaction with the product.
USER EXPERIENCE DESIGN

FORM

FIT

FUNCTION

FEEL
An engineer and a user’s idea of ‘functional’ is very different.
Technical performance is undercut by poor user experience in operating the system.
"System usability contributes to user confidence just as much as system performance."
WHY UX DESIGN?

Intuitive systems are safer systems.
Necessity is the mother of invention.
"Necessity is the mother of invention repurposed government furnished equipment."
The future warfighter will be accustomed to elegant UX Design seen in consumer products.
A value proposition is a description of the value the system will deliver to the customer, and the canvas helps break down what the need is and what the system should be, where it will be used, and who it is being designed to serve.
UX DESIGN TOOLS

Personas

STAKEHOLDER REQUIREMENTS

REQUIREMENTS ANALYSIS

ARCHITECTURE DESIGN

IMPLEMENTATION

TRANSITION

VALIDATION

VERIFICATION

INTEGRATION

STAKEHOLDER REQUIREMENTS

Personas

ARCHITECTURE DESIGN

IMPLEMENTATION

TRANSITION

VALIDATION

VERIFICATION

INTEGRATION
A persona is a representation of a user that incorporates the user’s goals, needs, and interests and is best based on actual research and observation of users.

Clark Andrews

Motivations
- Incentive
- Fear
- Achievement
- Growth
- Power
- Social

Goals
- To cut down on unhealthy eating and drinking habits
- To measure multiple aspects of life more scientifically
- To set goals and see and make positive impacts on his life

Frustrations
- Unfamiliar with wearable technology
- Saturated tracking market
- Manual tracking is too time consuming

Bio
Aaron is a systems software developer, a “dista junkie” and for the past couple of years, he has been very interested in tracking aspects of his health and performance. Aaron wants to track his mood, happiness, sleep quality and how his eating and exercise habits affect his well being. Although he only drinks occasionally with friends on the weekend, he would like to cut down on alcohol intake.

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UX DESIGN TOOLS

- Stakeholder Requirements
- Requirements Analysis
- Architecture Design
- Validation
- Verification
- Integration
- Transition

Storyboards
A storyboard is a visual tool to explore a user’s interaction and experience with a product, which often looks like a comic strip for how a person would use a product in the intended environment and how he/she might feel or react throughout the process.
UX DESIGN TOOLS

1. STAKEHOLDER REQUIREMENTS
2. REQUIREMENTS ANALYSIS
3. ARCHITECTURE DESIGN
4. INTEGRATION
5. VERIFICATION
6. VALIDATION
7. TRANSITION

Heuristics
Heuristic Analysis is an evaluation of how ‘user-friendly’ a product is and it is usually conducted by usability subject matter experts.

1. Visibility of system status
2. Match between system + real world
3. User control and freedom
4. Consistency and standards
5. Recognition rather than recall
6. Error prevention
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users with errors
10. Help and documentation

Nielsen, 1994a
CHALLENGES

UX Design Toolset is geared towards Software-Intensive Products

The Government lacks a burning platform

Systems Engineers would need to play the UX Designer Role

If you think good design is expensive, you should look at the cost of bad design.

Ralf Speth
THANK YOU | QUESTIONS?

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REFERENCES